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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/789,669	02/27/2004	Norman Paul Jouppi	200315363-1	7567

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EXAMINER	
OLSEN, LIN B	
ART UNIT	**PAPER NUMBER**
3609	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/789,669	JOUPPI, NORMAN PAUL	
	Examiner	Art Unit	
	Lin B. Olsen	3609	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *2/27/2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *2/27/2004*
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

The information disclosure statement (IDS) submitted on Feb 27, 2004 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Objections

Claims 12, and 24 are objected to because of the following informalities:

Claim 12, "logged information" does not have an antecedent basis. The claim will be examined as if it depended on claim 11.

Claim 24, "logged information" does not have an antecedent basis. The claim will be examined as if it depended on claim 23.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3 and 15 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are:

Claim 3, " after a period of time" is ambiguous; the starting point of the period of time should be specified.

Claim 15, " after a period of time" is ambiguous; the starting point of the period of time should be specified.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1-3, 7-9, 13-15, and 19-21 are rejected under 35 U.S.C. 102(b) as being anticipated by "Mobile Robot Survival", Fred R. Sias Jr. & Frank Heckendorn, Southeastcon'88, IEEE Conference Proceedings, pp. 497-501 (hereafter referred to as Sias Jr.). Sias Jr. describes a robot working in dangerous conditions that is initially remotely controlled, but might lost the wireless signal controlling it.

Regarding independent **claim 1**. " A method of mobile device control comprising: moving a surrogate under wireless control by a user" reads on Sias Jr. p. 500, 2nd ¶ under "Loss of Control Tether" where robots operated under radio and/or microwave control links are described. "autonomously moving the surrogate to regain wireless control when the wireless control is lost" reads on Sias Jr. p. 500, 4th ¶ under "Loss of Control Tether" where providing sufficient intelligence for the robot to retrace its immediate past movement is described.

Regarding **claim 2**, which is dependent on claim 1, "autonomously moving the surrogate along a previously determined route," reads on Sias Jr. p. 500, 4th ¶ under

"Loss of Control Tether" where the previously determined route is that followed by the robot in when under wireless control.

Regarding **claim 3**, which is dependent on claim 1, "autonomously moving the surrogate to regain wireless control occurs after a period of time" reads on Sias Jr:, p. 500, 3rd ¶ where time to allow the robot to roll slightly or turn the antenna are suggested.

Regarding independent **claim 7**, the limitation of "telepresencing" is not given any patentable weight because it the body of the claim does not depend on the preamble for completeness.

- moving a surrogate under real-time wireless control by a user; reads on Sias Jr. p500, 2nd ¶ under "Loss of Control Tether".
- autonomously moving the surrogate to an area with adequate wireless coverage to regain wireless control when the wireless control is lost for a period of time; reads on Sias Jr. p 500 4th ¶ under "Loss of Control Tether".

Regarding **claim 8**, which is dependent on claim 7, "autonomously moving the surrogate along at least one of a previously determined route, a distance, a destination, a direction, or a combination thereof" reads on Sias Jr. p. 500 4th ¶ under "Loss of Control Tether" where the robot autonomously moves along the previously taken route.

Regarding **claim 9**, which is dependent on claim 7,

- losing wireless control includes degradation of the control to a threshold level reads on Sias Jr. p. 500 3rd ¶ under "Loss of Control Tether" where the vehicle is stopped should the signal strength drop too seriously.

- autonomously moving the surrogate to regain wireless control occurs after a period of time, reads on Sias Jr., p. 500, 3rd ¶, where time to allow the robot to roll slightly or turn the antenna are suggested.

Regarding independent **claim 13** and dependent **claims 14 and 15**, these claims are system claims reciting the limitations of claims 1- 3 and are rejected for the same reasons.

Regarding independent **claim 19** and dependent **claims 20 and 21**, these claims are system claims reciting the limitations of claims 7-9 and are rejected for the same reasons.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim 4-6, 10-12, 16-18 and 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sias Jr. as detailed above in view of U.S. Patent No. 6,459,955 to Bartsch et al (hereafter referred to as Bartsch). Bartsch is concerned with a home cleaning robot. The robot is initially "taught" its cleaning route under remote control, and then executes the route independently.

Regarding **claim 4**, which is dependent on claim 1, "autonomously moving the surrogate includes measuring distance and avoiding collisions by the surrogate" while Sias Jr. is silent on whether the robot measures distance or avoids obstacles, Bartsch details, in col. 6 line 65 to col. 7 line 4, an example of a microprocessor-based control and mapping system that senses the distance traveled by the robot and a change in direction. Further in col. 7 lines 32- 34, obstruction sensors to sense a wall, column, or like obstruction and the distance to the obstruction are detailed. It would have been obvious to one of ordinary skill in the art at the time of the invention to include the features of Bartsch's robot in the Sias Jr.'s device, because it would implement known techniques to improve a similar robot in the same way to track it's position as it moves back to the known good signal area.

Regarding **claim 5**, which is dependent on claim 1, "moving the surrogate under wireless control includes logging forward motion using at least one of dead reckoning, odometry, directional measurement, differential wheel rotation, and a combination thereof" does not read on Sias Jr. which does not go into that much detail, but does

read on Bartsch col. 22 lines 10-23 where the learning mode of the robot is described including the output of the drive wheel motor and application specific sensor being recorded in memory. It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate this feature in Sias Jr., since Sias Jr.'s robot retraced its immediate past movements (Last sentence of 4th ¶ on 1st column of page 500), so must have recorded them in some way.

Regarding **claim 6**, which is dependent on claim 1,

- autonomously moving the surrogate uses logged information of forward movement using at least one of dead reckoning, odometry, directional measurement, differential wheel rotation, and a combination thereof, - Sias Jr. is silent on the method of autonomous movement, but Bartsch teaches training a robot, col. 4 lines 29-36, which involves among other methods, recording encoders from motors or wheels, recording images of the environment, and recording location of beacons. The robot assembles these data into a map, col. 6 lines 34-60, that is used to guide the robot when moving autonomously.
- autonomously moving the surrogate uses waypoints back along a forward movement path for backtracking movement, - Sias Jr. is silent on the method of autonomous movement, but Bartsch at col. 4, lines 32-34 teaches recording images and sonar responses which are incorporated in maps col. 6 lines 34-40 that guide the robot moving autonomously. It would have been obvious to one of

ordinary skill in the art at the time of the invention to use Bartsch's map-making capabilities in implementing Sias Jr. autonomous movement to retrace a path.

Regarding **claim 10**, which is dependent on claim 7

- autonomously moving the surrogate includes; backtracking while measuring distance - while Sias Jr. is silent on whether the robot measures distance or avoids obstacles, Bartsch details, in col. 6 line 65 to col. 7 line 4, an example of a microprocessor-based control and mapping system that senses the distance traveled by the robot and a change in direction. Further in col. 7 lines 32- 34, obstruction sensors to sense a wall, column, or like obstruction and the distance to the obstruction are detailed. avoiding collisions by the surrogate; stopping the surrogate for an obstacle; and resuming backtracking after removal of the obstacle. - Bartsch teaches that on detecting an obstacle, the robot stops and then turns to avoid the obstacle col. 22, lines 35-42. It further states that variations on this (such as waiting for removal of the obstacle) are also possible. It would have been obvious to one of ordinary skill in the art at the time of the invention to include the features of Bartsch's robot in the Sias Jr.'s device, because it would implement known techniques to improve a similar robot in the same way to track it's position and avoid obstacles as it moves back to the known good signal area.

Regarding **claim 11**, which is dependent on claim 7, "moving the surrogate under wireless control includes logging forward motion using at least one of dead reckoning, odometry, directional measurement, differential wheel rotation, and a combination thereof." does not read on Sias Jr. which does not go into that much detail, but does read on Bartsch col. 22 lines 10-23 where the learning mode of the robot is described including the output of the drive wheel motor and application specific sensor being recorded in memory. It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate this feature in Sias Jr., since Sias Jr.'s robot retraced its immediate past movements (Last sentence of 4th ¶ on 1st column of page 500), so must have recorded them in some way.

Regarding claim 12, which is dependent on claim 7

- autonomously moving the surrogate to backtrack uses logged information of forward movement using at least one of dead reckoning, odometry, directional measurement, differential wheel rotation, and a combination thereof; - Sias Jr. is silent on the method of autonomous movement, but Bartsch teaches training a robot, col. 4 lines 29-36, which involves among other methods, recording encoders from motors or wheels, recording images of the environment, and recording location of beacons. The robot assembles these data into a map, col. 6 lines 34-60, that is used to guide the robot when moving autonomously
- autonomously moving the surrogate to backtrack uses a slower speed than forward speed – Sias Jr. and Bartsch are silent on the relative speed of a

backtracking robot vs. a robot being moved by remote control. The Examiner takes official notice that a machine executing a sequence of transmitted movement commands will move more quickly than a machine, observing its surroundings, determining its own sequence of actions and moving itself.

- autonomously moving the surrogate uses waypoints back along a forward movement path for backtracking movement considering the slower speed of backtracking. - Sias Jr. is silent on the method of autonomous movement, but Bartsch at col. 4, lines 32-34 teaches recording images and sonar responses as waypoints which are incorporated in maps col. 6 lines 34-40 that guide the robot moving autonomously. It would have been obvious to one of ordinary skill in the art at the time of the invention to use Bartsch's map-making capabilities in implementing Sias Jr. autonomous movement to retrace a path.

Regarding **claims 16, 17 and 18**, which are dependent on claim 13, these claims are system claims reciting the limitations of claims 4-6 and are rejected for the same reasons.

Regarding **claims 22, 23, and 24**, which are dependent on claim 19, these claims are system claims reciting the limitations of claims 10-12 and are rejected for the same reasons.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Nguyen, Pezeshkian, Gupta & Farrington "Maintaining

Communication Link for a Robot Operating in a Hazardous Environment", ANS 10th Int Conf on Robotics and Remote Systems for Hazardous Environments, March 28-31, 2004 for localization and mapping; Richardson & Rodgers, "Vision-based semi-autonomous outdoor robot system to reduce soldier workload", Proceedings of SPIE Vol 4363, 2001 pgs. 12 –18, for robots retracing learned path.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lin B. Olsen whose telephone number is 571-272-9754. The examiner can normally be reached on M-F, 7:30am-5:00pm EST, Alternate Fri. off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian T. Pendleton can be reached on 571-272-7527. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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SUPERVISORY PATENT EXAMINER